

## CLAIMS

What is claimed is:

1. A method of multicast communication within an ad hoc broadcast network, comprising:

5 defining a shared multicast mesh of routers for each multicast group wherein multiple paths are established between any two routers; and

forwarding packets from a source connected within the multicast mesh of the group along the reverse shortest path to the receiver.

10 2. A method as recited in claim 1, wherein said routers are configured to accept unique packets being received from any neighboring router within the multicast mesh.

15 3. A method as recited in claim 1, wherein said routers maintain the mapping of reverse shortest path to the receivers.

4. A method as recited in claim 3, wherein routers maintain reverse shortest path mapping by sending out a heartbeat message to successors when packets arrive through members other than their respective reverse shortest path, wherein the  
20 heartbeat message as received by the successor triggers a push join operation to force the successor and all routers in the path to the traffic source to join the mesh.

5. A method as recited in claim 3, wherein routing is established between routers such that network flooding with data or control packets to establish a routing structure is not required.

5 6. A method as recited in claim 1, wherein routers for sender-only hosts may join the multicast mesh in simplex mode.

7. A method as recited in claim 1, wherein routers share group membership reports with neighbors and track relationships between neighbors and groups.

10 8. A method as recited in claim 7, wherein multicast addresses are mapped to one or more cores as part of a group membership report.

15 9. A method as recited in claim 1, wherein routers are configured to allow the definition of multiple cores for a group within the multicast mesh.

10. A method of allowing a host to join a multicast mesh for multicast communication within an ad hoc broadcast network, comprising:

20 determining the address of a first multicast group to which said host desires to join;

interacting with a first designated router, by said host, requesting that it gain membership in said first multicast group;

announcing membership in the first multicast group if the first designated router joining has multiple neighboring routers which are duplex members of the first multicast group; and

5 sending a join request for membership in the first multicast group to neighboring routers if one or fewer of the neighboring routers are duplex members of the first multicast group.

10 11. A method as recited in claim 10, wherein the routers are configured to generate an acknowledgement to the join request, such that non-core routers can acknowledge group membership.

12. A method of maintaining shortest path routes within a group's mesh populated with routers, comprising:

15 caching packet identifiers of forwarded packets;

forwarding a multicast packet from a neighboring router if the packet identifier is not contained within the cache; and

transmitting heartbeat messages whenever traffic arrives through a path from the source that is not the reverse shortest path, wherein the heartbeat message is configured to trigger a push join to correct routing.

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